

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14

Applicant's or agent's file reference PD990019	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP00/01929	International filing date (day/month/year) 06/03/2000	Priority date (day/month/year) 19/03/1999
International Patent Classification (IPC) or national classification and IPC G11B27/32		
<p>Applicant DEUTSCHE THOMSON-BRANDT GMBH</p> <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 7 sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input checked="" type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 		

Date of submission of the demand 21/09/2000	Date of completion of this report 05.03.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer de Dieuleveult, A Telephone No. +49 89 2399 8946



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/01929

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*):

Description, pages:

2,4-6,8-11, as originally filed
13-19

1,3,7,12 as received on 19/02/2001 with letter of 19/02/2001

Claims, No.:

1-12 as received on 19/02/2001 with letter of 19/02/2001

Drawings, sheets:

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/01929

the description, pages:

the claims, Nos.:

the drawings, sheets:

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-12
 No: Claims

Inventive step (IS) Yes: Claims 1-12
 No: Claims

Industrial applicability (IA) Yes: Claims 1-12
 No: Claims

2. Citations and explanations
see separate sheet

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/01929

V. Reasoned statement

1. Claims 1 and 7:

The available prior art documents neither disclose nor fairly suggest a method and a recorder for implementing trickplay modes in a bitstream recorder, wherein the bitstream is organised in stream objects and access to the bitstream is performed using access units and access unit information is attached to the stream objects of the bitstream and to navigation data recorded, or to be recorded, and wherein said access unit information includes an access unit start map, and optionally an access unit end map, which are used in the trickplay modes together with the navigation data for access to the bitstream.

Therefore, the requirements of Article 33 PCT appear to be met.

2. Claims 2-6 and 8-12:

These dependent claims are dependent claims and, per se, also meet the requirements of Article 33 PCT.

VI. Certain documents

1. Application EP00100595.8 filed on 12.01.2000 and published on 19.07.2000 as EP-A-1 021 048, claims a priority date of 14.01.1999 and is therefore relevant according to Rule 64.3 PCT.
2. Applications EP99250179.1 and EP99250056.1 filed respectively on 08.06.1999 and on 02.03.1999 and published on 15.03.2000 as EP-A-0 986 062 and EP-A-0 986 248, both claim a priority date of 07.09.1998 and might also become relevant to the question of novelty.

VIII. Certain observations

Independent claims 1 and 7 contravene Article 6 PCT, since it is not clear:

- how the trickplay modes are actually achieved since method claim 1 (resp., apparatus claim 7) does not comprise any functional features (resp., any structural features) so that the claimed subject-matter only represents the result-to-be-achieved;
- what is to be understood by terms such as "access unit" and "navigation data" and whether expressions such as "entry points" or "table of content" could fall within their equivalents.

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION
(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 13 November 2000 (13.11.00)	
International application No. PCT/EP00/01929	Applicant's or agent's file reference PD990019
International filing date (day/month/year) 06 March 2000 (06.03.00)	Priority date (day/month/year) 19 March 1999 (19.03.99)
Applicant WINTER, Marco et al	

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:
21 September 2000 (21.09.00)

in a notice effecting later election filed with the International Bureau on:

2. The election was
 was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
-----------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------

PENT COOPERATION TREA

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

Date of mailing (day/month/year) 30 October 2001 (30.10.01)
Applicant's or agent's file reference PD990019
International application No. PCT/EP00/01929

From the INTERNATIONAL BUREAU

To:

HARTNACK, Wolfgang
Deutsche Thomson-Brandt GmbH
European Patent Operations
Karl-Wiechert-Allee 74
D-30625 Hannover
ALLEMAGNE

RECEIVED
NOV 29 2001
Technology Center 2600

IMPORTANT NOTIFICATION

International filing date (day/month/year) 06 March 2000 (06.03.00)

1. The following indications appeared on record concerning:

the applicant the inventor the agent the common representative

Name and Address DEUTSCHE THOMSON-BRANDT GMBH Hermann-Schwer-Str. 3 D-78048 Villingen-Schwenningen Germany	State of Nationality DE	State of Residence DE
	Telephone No. +49 511 418 0	
	Facsimile No. +49 511 418 2811	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

the person the name the address the nationality the residence

Name and Address THOMSON LICENSING S.A. 46, Quai A. Le Gallo F-92100 Boulogne-Billancourt France	State of Nationality FR	State of Residence FR
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:	
<input checked="" type="checkbox"/> the receiving Office <input type="checkbox"/> the International Searching Authority <input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> the designated Offices concerned <input checked="" type="checkbox"/> the elected Offices concerned <input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer François BAECHLER Telephone No.: (41-22) 338.83.38
-----------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------

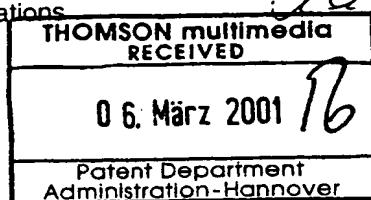
PATENT COOPERATION TREATY

09/936983

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

Hartnack, Wolfgang
DEUTSCHE THOMSON-BRANDT GMBH
European Patent Operations
Karl-Wiechert-Allee 74
D-30625 Hannover
ALLEMAGNE



PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year) 05.03.2001

Applicant's or agent's file reference
PD990019

IMPORTANT NOTIFICATION

International application No.
PCT/EP00/01929

International filing date (day/month/year)
06/03/2000

Priority date (day/month/year)
19/03/1999

Applicant
DEUTSCHE THOMSON-BRANDT GMBH

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Atienza Vivancos, B

Tel. +49 89 2399-7891



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PD990019	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP00/01929	International filing date (day/month/year) 06/03/2000	Priority date (day/month/year) 19/03/1999	
International Patent Classification (IPC) or national classification and IPC G11B27/32			
<p>Applicant DEUTSCHE THOMSON-BRANDT GMBH</p> <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 7 sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input checked="" type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 			

Date of submission of the demand 21/09/2000	Date of completion of this report 05.03.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer de Dieuleveult, A Telephone No. +49 89 2399 8946



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/01929

I. Basis of the report

1. This report has been drawn on the basis of (substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):

Description, pages:

2,4-6,8-11, as originally filed
13-19

1,3,7,12 as received on 19/02/2001 with letter of 19/02/2001

Claims, No.:

1-12 as received on 19/02/2001 with letter of 19/02/2001

Drawings, sheets:

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/01929

the description, pages:

the claims, Nos.:

the drawings, sheets:

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-12
 No: Claims

Inventive step (IS) Yes: Claims 1-12
 No: Claims

Industrial applicability (IA) Yes: Claims 1-12
 No: Claims

**2. Citations and explanations
see separate sheet**

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V. Reasoned statement

1. Claims 1 and 7:

The available prior art documents neither disclose nor fairly suggest a method and a recorder for implementing trickplay modes in a bitstream recorder, wherein the bitstream is organised in stream objects and access to the bitstream is performed using access units and access unit information is attached to the stream objects of the bitstream and to navigation data recorded, or to be recorded, and wherein said access unit information includes an access unit start map, and optionally an access unit end map, which are used in the trickplay modes together with the navigation data for access to the bitstream.

Therefore, the requirements of Article 33 PCT appear to be met.

2. Claims 2-6 and 8-12:

These dependent claims are dependent claims and, per se, also meet the requirements of Article 33 PCT.

VI. Certain documents

1. Application EP00100595.8 filed on 12.01.2000 and published on 19.07.2000 as EP-A-1 021 048, claims a priority date of 14.01.1999 and is therefore relevant according to Rule 64.3 PCT.
2. Applications EP99250179.1 and EP99250056.1 filed respectively on 08.06.1999 and on 02.03.1999 and published on 15.03.2000 as EP-A-0 986 062 and EP-A-0 986 248, both claim a priority date of 07.09.1998 and might also become relevant to the question of novelty.

VIII. Certain observations

Independent claims 1 and 7 contravene Article 6 PCT, since it is not clear:

- how the trickplay modes are actually achieved since method claim 1 (resp., apparatus claim 7) does not comprise any functional features (resp., any structural features) so that the claimed subject-matter only represents the result-to-be-achieved;
- what is to be understood by terms such as "access unit" and "navigation data" and whether expressions such as "entry points" or "table of content" could fall within their equivalents.

The invention relates to an improved trickplay processing for a data stream recorder, in particular a DVD based data stream recorder.

Background

10 Stream recording assumes an application device, e.g. a set-top box, connected to a DVD Streamer. Both devices are connected via e.g. an IEEE1394 (IEC 61883) interface including transmitting and receiving firmware.

15 Stream Data include one or more 'Stream Objects' which each can be stored as a 'Program Stream' as described in ISO/IEC 13818-1, Systems.

The following abbreviations are used in the description:

APAT: application packet arrival time, ATS: application timestamp, AU: access unit, AUD: AU data, AUELL: access unit 20 end location list, AUEM: access unit end map, AULL: access unit location list, AUSLL: access unit start location list, AUSM: access unit start map, DTS: decoding timestamp, DVD: digital versatile disc, DVD RTRW: DVD realtime rewritable, DVD VR: DVD video recording, EPG: electronic program guide, 25 IAPAT: incremental application packet arrival time, MAPL: mapping list, LB: logical block, PAT: packet arrival time, PES: packetised elementary stream, PTS: presentation timestamp, SCR: system clock reference, SOB: stream object, SOBU: stream object unit, STB: set top box, S_PCK: stream 30 pack, TOC: table of content.

A SOB can be terminated by a program_end_code. The value of the SCR field in the first pack of each SOB may be non-zero. A SOB contains the Stream Data packed into a sequence of 35 Stream Packs. Stream data can be organised as one elementary stream and are carried in PES packets with a stream_id.

- the sector & application packet location of the start of the AU and
- 5 • the sector & application packet location of the end of the data which starts at the AU (e.g. the end of the I-frame) and
- the PTS of the AU
- or
- 10 • the start APAT of the AU
- the end APAT of the AU (e.g. the end of the I-frame) and
- the PTS of the AU
- or
- the start ATS of the AU
- 15 • the Access Unit End Map AUEM of the AU (for the end ATS of the AUs)
- the end ATS of the AU, based on AUDEM, not AUSM, and
- the PTS of the AU.

20 It is possible to have a subset only of the above values, e.g. AUSM or AUSM and AUDEM.

It is one object of the invention to disclose a method and a recorder for implementing trickplay modes in a data stream recorder. This object is achieved by the features disclosed in claims 1 and 7.

A trickplay mode, e.g. fast forward, is performed by selecting the desired AUs, e.g. each second AU, via AUSM/AUDEM.

30 The generation of AUSM, AUDEM, AUSLL and AUELL during SOB recording is optional, i.e. is a matter of the manufacturer. The use of AUSM, AUDEM, AUSLL and AUELL for trickplay modes is also optional. However, it is mandatory to update AUSM, AUDEM and AULL in the case of editing. Fig. 3 to 5 show three examples.

The DVD Streamer specification defines the syntax of the

Fig. 6 table showing the maximum possible Access Unit support which is storable by a specific configuration;

5 Fig. 7 structure of a Stream Object Information;

Fig. 8 structure of the AUD_FLAG byte;

Fig. 9 structure of the Access Unit Data;

Fig. 10 example of an AUSM and its corresponding SOBUS;

10 Fig. 11 example of AUSM, AUSLL, AUDEM, AUELL and the related data access mechanism.

Exemplary embodiments

15 Fig. 1 shows a simplified block diagram of a settop box AD and a Stream recorder device STRD. AD interacts via an interface IF, e.g. an IEEE1394 interface, with STRD. AD sends its data via output buffering & timestamping handling means BTHOAD to IF and receives from IF data via input buffering & timestamping handling means BTHIAD. A streamer STR within STRD sends its data via output buffering & timestamping handling means BTHO to IF and receives from IF data via input buffering & timestamping handling means BTHI.

20 Instead of an IEEE1394 connection any other network like the Ethernet or the Internet can be used.

25 Instead of a settop box any other data stream source can be used, e.g. a DVD player or a PC or Internet receiver.

30 The DVD Stream Recording system is designed to use rewritable DVD discs for recording existing digital bitstreams, editing them and playing them back as bitstreams. This system is designed to satisfy the following requirements:

35 • A timing mechanism, i.e. a time stamp is added to every broadcast packet to enable proper packet delivery during playback.

• To enlarge the fields of applications, non-real-time re-

	Contents	Number of Bytes
(1) SOB_TY	SOB Type	1
(2) SOB_REC_TM	SOB Recording Time	5
(3) SOB_STI_N	SOB Stream Information Number	1
(4) AUD_FLAGS	Access Unit Data Flags	1
(5) SOB_S_APAT	SOB Start APAT	6
(6) SOB_E_APAT	SOB End APAT	6
(7) SOB_S_SOBU	first SOBU of this SOB	4
(8) MAPL_ENT_Ns	number of Mapping List entries	4
	Total	28

(1) SOB_TY

Describes the Stream Object Type, containing bits for Temporal Erase state (TBD) and for Copy Generation Management

5 System (TBD).

(2) SOB_REC_TM

Describes the recording time of the associated Stream Object in DVD Stream Recording's Date and Time Describing Format defined above.

10 (3) SOB_STI_N

Describes the index of the SOB_STI which is valid for this Stream Object.

(4) AUD_FLAGS

15 Indicates whether and what kind of Access Unit Data exist for this SOB. If Access Unit Data exist, then AUD_FLAGS also describes several properties of the Access Unit Data. The Access Unit Data itself is described below and includes the number of Entry Points and the tables AUSM, AUSLL, AUDEM, AUELL and PTSLL. The content of AUD_FLAGS is depicted in

20 Fig. 8.

RTAU_FLG 0: no AU flags exist inside the RT Data of this SOB

25 1: AU flags may exist inside the RT Data of this SOB. This state is even allowed, when no further Access Unit Data exist for this SOB, i.e. if AUD_FLG = 0b.

Claims

5 1. Method for implementing trickplay modes in a bitstream recorder (STRD), wherein the bitstream is organised in stream objects (SOB) and access to the bitstream is performed using access units (AU) and access unit information is attached to the stream objects of the bitstream and to navigation data recorded, or to be recorded, and wherein said access unit information includes an access unit start map (AUSM), and optionally an access unit end map (AUDEM), which are used in the trickplay modes together with the navigation data for access to the bitstream.

10

15

20 2. Method according to claim 1, wherein said trickplay modes include fast forward, fast reverse, slow motion, single picture step and/or still picture.

25 3. Method according to claim 1 or 2, wherein said bitstream contains access unit start and access unit end marks which indicate the start or the end of an access unit, respectively.

30

35 4. Method according to any of claims 1 to 3, wherein said access unit information includes an access unit start map (AUSM) and optional one or more of access unit end map (AUDEM), access unit start location list (AUSLL) and access unit end location list (AUELL).

40

45 5. Method according to claim 4 wherein, if the access unit end map (AUDEM) exists, for each access unit start map (AUSM) entry an access unit end map (AUDEM) entry is provided.

50

55 6. Method according to claim 4 or 5, wherein the index of each access unit end map entry is equal to or greater

19-02-2001

21

than the entry index of its corresponding access unit start map entry and is less than the index of the immediately following access unit start map entry if any following access unit start map entry exists.

7. Bitstream recorder (STRD) implementing trickplay modes, wherein the bitstream is organised in stream objects (SOB) and access to the bitstream is performed using access units (AU) and access unit information is attached to the stream objects of the bitstream and to navigation data recorded, or to be recorded, and wherein said access unit information includes an access unit start map (AUSM), and optionally an access unit end map (AUEM), which are used in the trickplay modes together with the navigation data for access to the bitstream.
8. Recorder according to claim 7, wherein said trickplay modes include fast forward, fast reverse, slow motion, single picture step and/or still picture.
9. Recorder according to claims 7 or 8, wherein said bitstream contains access unit start and access unit end marks which indicate the start or the end of an access unit, respectively.
10. Recorder according to any of claims 7 to 9, wherein said access unit information includes an access unit start map (AUSM) and optional one or more of access unit end map (AUEM), access unit start location list (AUSLL) and access unit end location list (AUELL).
11. Recorder according to claim 10 wherein, if the access unit end map (AUEM) exists, for each access unit start map (AUSM) entry an access unit end map (AUEM) entry is provided.

AMENDED SHEET

12. Recorder according to claim 10 or 11, wherein the index of each access unit end map entry is equal to or greater than the entry index of its corresponding access unit start map entry and is less than the index of the immediately following access unit start map entry if any following access unit start map entry exists.

PATENT COOPERATION TREATY

PCT

09/936983

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PD990019	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 00/01929	International filing date (day/month/year) 06/03/2000	(Earliest) Priority Date (day/month/year) 19/03/1999
Applicant DEUTSCHE THOMSON-BRANDT GMBH		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

contained in the international application in written form.

filed together with the international application in computer readable form.

furnished subsequently to this Authority in written form.

furnished subsequently to this Authority in computer readable form.

the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. Certain claims were found unsearchable (See Box I).

3. Unity of Invention is lacking (see Box II).

4. With regard to the title,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the abstract,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

as suggested by the applicant.

because the applicant failed to suggest a figure.

because this figure better characterizes the invention.

3

None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP 00/01929

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The abstract is modified as follows:

Line 6 : after "Systems" delete the part beginning with "The invention" until line 7 ending with "DVD Streamer"

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/01929

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G11B27/32 G11B20/12 G11B27/10 H04N9/804 //H04N5/85

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 G11B H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	EP 1 021 048 A (TOKYO SHIBAURA ELECTRIC CO) 19 July 2000 (2000-07-19) page 7, line 48 -page 9, line 10 page 16, line 54 -page 17, line 1 page 18, line 26 -page 19, line 45 ---	1-7
E	EP 0 986 248 A (THOMSON BRANDT GMBH) 15 March 2000 (2000-03-15) page 9, line 32-45 ---	1,2
A	EP 0 729 153 A (HITACHI LTD) 28 August 1996 (1996-08-28) the whole document ---	1-3
A	EP 0 673 034 A (SONY CORP) 20 September 1995 (1995-09-20) page 24, line 39 -page 28, line 16 ---	1-3
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 July 2000	04/08/2000
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016	Authorized officer Mourik, J

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/01929

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	EP 0 986 062 A (THOMSON BRANDT GMBH) 15 March 2000 (2000-03-15) the whole document ----	1,2
P,A	EP 0 903 738 A (MATSUSHITA ELECTRIC IND CO LTD) 24 March 1999 (1999-03-24) the whole document & A: CA 2 247 603 (1999-03-17) -----	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/01929

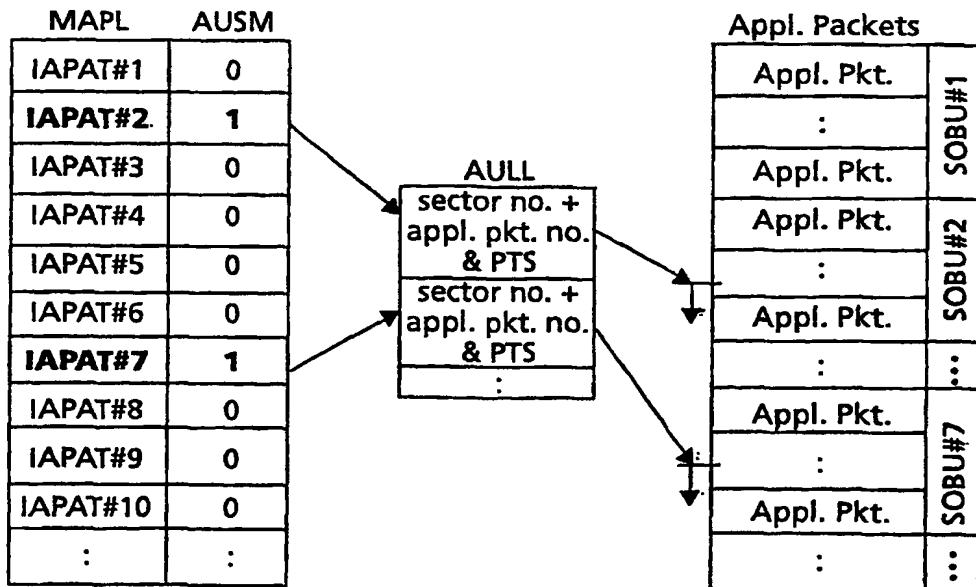
Patent document cited in search report	Publication date	Patent family member(s)			Publication date
EP 1021048	A 19-07-2000	NONE			
EP 0986248	A 15-03-2000	AU 5854899 A			27-03-2000
		WO 0014952 A			16-03-2000
EP 0729153	A 28-08-1996	JP 8235833 A			13-09-1996
		CN 1135072 A			06-11-1996
		CN 1229235 A			22-09-1999
		EP 0930618 A			21-07-1999
		US 6002834 A			14-12-1999
		US 6009237 A			28-12-1999
EP 0673034	A 20-09-1995	AU 681259 B			21-08-1997
		AU 1824595 A			18-09-1995
		BR 9505853 A			21-02-1996
		CA 2160913 A			08-09-1995
		CN 1115076 A			17-01-1996
		CN 1124062 A			05-06-1996
		EP 0696799 A			14-02-1996
		JP 7311950 A			28-11-1995
		WO 9524037 A			08-09-1995
		PL 311310 A			05-02-1996
		SG 24104 A			10-02-1996
		US 5734787 A			31-03-1998
		US 5592450 A			07-01-1997
		US 5596565 A			21-01-1997
		US 5745505 A			28-04-1998
EP 0986062	A 15-03-2000	EP 0991072 A			05-04-2000
		AU 5742899 A			27-03-2000
		WO 0014744 A			16-03-2000
		AU 5854999 A			27-03-2000
		WO 0014743 A			16-03-2000
EP 0903738	A 24-03-1999	JP 11096730 A			09-04-1999
		JP 3028517 B			04-04-2000
		JP 11155130 A			08-06-1999
		CN 1239574 T			22-12-1999
		WO 9914754 A			25-03-1999
		JP 3026808 B			27-03-2000
		JP 3026809 B			27-03-2000
		JP 3026810 B			27-03-2000
		JP 2000101973 A			07-04-2000
		US 6078727 A			20-06-2000



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : G11B 27/32, 20/12, 27/10, H04N 9/804 // 5/85		A1	(11) International Publication Number: WO 00/57421
			(43) International Publication Date: 28 September 2000 (28.09.00)
(21) International Application Number: PCT/EP00/01929		(81) Designated States: AE, AL, AU, BA, BB, BG, BR, CA, CN, CR, CU, CZ, DM, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LU, LV, MA, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, TR, TT, UA, US, UZ, VN, YU, ZA, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 6 March 2000 (06.03.00)			
(30) Priority Data: 99250083.5 19 March 1999 (19.03.99) EP 99250139.5 28 April 1999 (28.04.99) EP 99250231.0 13 July 1999 (13.07.99) EP			
(71) Applicant (for all designated States except US): DEUTSCHE THOMSON-BRANDT GMBH [DE/DE]; Hermann-Schwer-Str. 3, D-78048 Villingen-Schwenningen (DE).		Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	
(72) Inventors; and (75) Inventors/Applicants (for US only): WINTER, Marco [DE/DE]; Böhmerstr. 17, D-30173 Hannover (DE). SCHILLER, Harald [DE/DE]; Apfelgarten 11, D-30539 Hannover (DE).			
(74) Agent: HARTNACK, Wolfgang; Deutsche Thomson-Brandt GmbH, European Patent Operations, Karl-Wiechert-Allee 74, D-30625 Hannover (DE).			

(54) Title: METHOD FOR IMPLEMENTING TRICKPLAY MODES IN A DATA STREAM RECORDER



(57) Abstract

Stream recording assumes e.g. a settop box to be connected to a DVD Streamer. The connection is e.g. of IEEE1394 type using interfaces including transmitting and receiving firmware. Stream Data include one or more Stream Objects which each can be stored as a Program Stream as described in ISO/IEC 13818-1, Systems. Each Stream Object contains its own Access Unit data. A trickplay mode, e.g. fast forward, is performed by selecting the desired Access Units which are derived from a mapping list with incremental application packet arrival times.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/01929

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G11B27/32 G11B20/12 G11B27/10 H04N9/804 //H04N5/85

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	EP 1 021 048 A (TOKYO SHIBAURA ELECTRIC CO) 19 July 2000 (2000-07-19) page 7, line 48 -page 9, line 10 page 16, line 54 -page 17, line 1 page 18, line 26 -page 19, line 45 ----	1-7
E	EP 0 986 248 A (THOMSON BRANDT GMBH) 15 March 2000 (2000-03-15) page 9, line 32-45 ----	1,2
A	EP 0 729 153 A (HITACHI LTD) 28 August 1996 (1996-08-28) the whole document ----	1-3
A	EP 0 673 034 A (SONY CORP) 20 September 1995 (1995-09-20) page 24, line 39 -page 28, line 16 ----	1-3
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

28 July 2000

04/08/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Mourik, J

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/01929

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	EP 0 986 062 A (THOMSON BRANDT GMBH) 15 March 2000 (2000-03-15) the whole document ----	1,2
P,A	EP 0 903 738 A (MATSUSHITA ELECTRIC IND CO LTD) 24 March 1999 (1999-03-24) the whole document & A: CA 2 247 603 (1999-03-17) -----	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/01929

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP 1021048	A 19-07-2000	NONE		
EP 0986248	A 15-03-2000	AU 5854899 A		27-03-2000
		WO 0014952 A		16-03-2000
EP 0729153	A 28-08-1996	JP 8235833 A		13-09-1996
		CN 1135072 A		06-11-1996
		CN 1229235 A		22-09-1999
		EP 0930618 A		21-07-1999
		US 6002834 A		14-12-1999
		US 6009237 A		28-12-1999
EP 0673034	A 20-09-1995	AU 681259 B		21-08-1997
		AU 1824595 A		18-09-1995
		BR 9505853 A		21-02-1996
		CA 2160913 A		08-09-1995
		CN 1115076 A		17-01-1996
		CN 1124062 A		05-06-1996
		EP 0696799 A		14-02-1996
		JP 7311950 A		28-11-1995
		WO 9524037 A		08-09-1995
		PL 311310 A		05-02-1996
		SG 24104 A		10-02-1996
		US 5734787 A		31-03-1998
		US 5592450 A		07-01-1997
		US 5596565 A		21-01-1997
		US 5745505 A		28-04-1998
EP 0986062	A 15-03-2000	EP 0991072 A		05-04-2000
		AU 5742899 A		27-03-2000
		WO 0014744 A		16-03-2000
		AU 5854999 A		27-03-2000
		WO 0014743 A		16-03-2000
EP 0903738	A 24-03-1999	JP 11096730 A		09-04-1999
		JP 3028517 B		04-04-2000
		JP 11155130 A		08-06-1999
		CN 1239574 T		22-12-1999
		WO 9914754 A		25-03-1999
		JP 3026808 B		27-03-2000
		JP 3026809 B		27-03-2000
		JP 3026810 B		27-03-2000
		JP 2000101973 A		07-04-2000
		US 6078727 A		20-06-2000

REPLACED BY

ART 34 AMDT

Method for implementing trickplay modes in a data stream recorder

The invention relates to an improved trickplay processing
 5 for a data stream recorder, in particular a DVD based data
 stream recorder.

Background

10

Stream recording assumes an application device, e.g. a set-top box, connected to a DVD Streamer. Both devices are connected via e.g. an IEEE1394 (IEC 61883) interface including transmitting and receiving firmware.

15 Stream Data include one or more 'Stream Objects' which each can be stored as a 'Program Stream' as described in ISO/IEC 13818-1, Systems.

The following abbreviations are used in the description:

APAT: application packet arrival time, ATS: application
 20 timestamp, AU: access unit, AUD: AU data, AUELL: access unit end location list, AUEM: access unit end map, AULL: access unit location list, AUSLL: access unit start location list, AUSM: access unit start map, DTS: decoding timestamp, DVD: digital versatile disc, DVD RTRW: DVD realtime rewritable,
 25 DVD VR: DVD video recording, IAPAT: incremental application packet arrival time, MAPL: mapping list, LB: logical block, PAT: packet arrival time, PES: packetised elementary stream, PTS: presentation timestamp, SCR: system clock reference, SOB: stream object, STB: set top box, S_PCK: stream pack,
 30 TOC: table of content.

A SOB can be terminated by a program_end_code. The value of the SCR field in the first pack of each SOB may be non-zero.

35 A SOB contains the Stream Data packed into a sequence of Stream Packs. Stream data can be organised as one elementary stream and are carried in PES packets with a stream_id.

- the sector & application packet location of the start of the AU and
- the sector & application packet location of the end of the data which starts at the AU (e.g. the end of the I-frame)

5 and

- the PTS of the AU
- or
- the start APAT of the AU
- the end APAT of the AU (e.g. the end of the I-frame) and

10 ◦ the PTS of the AU

- or
- the start ATS of the AU
- the Access Unit End Map AUEM of the AU (for the end ATS of the AUs)

15 ◦ the end ATS of the AU, based on AUDEM, not AUSM, and

- the PTS of the AU.

It is possible to have a subset only of the above values, e.g. AUSM or AUSM and AUDEM.

20

It is one object of the invention to disclose a method and a recorder for implementing trickplay modes in a data stream recorder. This object is achieved by the features disclosed in claim 1.

25

A trickplay mode, e.g. fast forward, is performed by selecting the desired AUs, e.g. each second AU, via AUSM/AUDEM.

The generation of AUSM, AUDEM, AUSLL and AUELL during SOB recording is optional, i.e. is a matter of the manufacturer.

30

The use of AUSM, AUDEM, AUSLL and AUELL for trickplay modes is also optional. However, it is mandatory to update AUSM, AUDEM and AULL in the case of editing. Fig. 3 to 5 show three examples.

35 The DVD Streamer specification defines the syntax of the

Fig. 6 table showing the maximum possible Access Unit support which is storables by a specific configuration;

Fig. 7 structure of a Stream Object Information;

Fig. 8 structure of the AUD_FLAG byte;

5 Fig. 9 structure of the Access Unit Data;

Fig. 10 example of an AUSM and its corresponding SOBUs;

Fig. 11 example of AUSM, AUSLL, AUDEM, AUELL and the related data access mechanism.

10

Exemplary embodiments

Fig. 1 shows a simplified block diagram of a settop box AD and a Stream recorder device STRD. AD interacts via an interface IF, e.g. an IEEE1394 interface, with STRD. AD sends its data via output buffering & timestamping handling means BTHOAD to IF and receives from IF data via input buffering & timestamping handling means BTHIAD. A streamer STR within STRD sends its data via output buffering & timestamping handling means BTHO to IF and receives from IF data via input buffering & timestamping handling means BTHI.

Instead of an IEEE1394 connection any other network like the Ethernet or the Internet can be used.

Instead of a settop box any other data stream source can be used, e.g. a DVD player or a PC or Internet receiver. In that case ANT and TU is replaced by e.g. an optical disc and a pickup.

The DVD Stream Recording system is designed to use rewritable DVD discs for recording existing digital bitstreams, editing them and playing them back as bitstreams. This system is designed to satisfy the following requirements:

o A timing mechanism, i.e. a time stamp is added to every broadcast packet to enable proper packet delivery during playback.

o To enlarge the fields of applications, non-real-time re-

	Contents	Number of Bytes
(1) SOB_TY	SOB Type	1
(2) SOB_REC_TM	SOB Recording Time	5
(3) SOB_STI_N	SOB Stream Information Number	1
(4) AUD_FLAGS	Access Unit Data Flags	1
(5) SOB_S_APAT	SOB Start APAT	6
(6) SOB_E_APAT	SOB End APAT	6
(7) SOB_S_SOBU	first SOBU of this SOB	4
(8) MAPL_ENT_Ns	number of Mapping List entries	4
	Total	28

(1) SOB_TY

Describes the Stream Object Type, containing bits for Temporal Erase state (TBD) and for Copy Generation Management System (TBD).

5 (2) SOB_REC_TM

Describes the recording time of the associated Stream Object in DVD Stream Recording's Date and Time Describing Format defined above.

(3) SOB_STI_N

10 Describes the index of the BOB_STI which is valid for this Stream Object.

(4) AUD_FLAGS

15 Indicates whether and what kind of Access Unit Data exist for this SOB. If Access Unit Data exist, then AUD_FLAGS also describes several properties of the Access Unit Data. The Access Unit Data itself is described below and includes the number of Entry Points and the tables AUSM, AUSLL, AUDEM, AUELL and PTSLL. The content of AUD_FLAGS is depicted in Fig. 8.

20 RTAU_FLG 0: no AU flags exist inside the RT Data of this SOB

1: AU flags may exist inside the RT Data of this SOB. This state is even allowed, when no further Access Unit Data exist for this SOB, i.e. if AUD_FLG = 0b.

Claims

1. Method for implementing trickplay modes in a bitstream recorder (STRD), wherein the bitstream is organised in stream objects (SOB) and access to the bitstream is performed using access units (AU) and access unit information is attached to the stream objects of the bitstream and to navigation data recorded, or to be recorded, and wherein said access unit information includes an access unit start map (AUSM), and optionally an access unit end map (AUEM), which are used in the trickplay modes together with the navigation data for access to the bitstream.
- 15 2. Bitstream recorder (STRD) implementing trickplay modes, wherein the bitstream is organised in stream objects (SOB) and access to the bitstream is performed using access units (AU) and access unit information is attached to the stream objects of the bitstream and to navigation data recorded, or to be recorded, and wherein said access unit information includes an access unit start map (AUSM), and optionally an access unit end map (AUEM), which are used in the trickplay modes together with the navigation data for access to the bitstream.
- 20 3. Method or recorder according to claim 1 or 2, wherein said trickplay modes include fast forward, fast reverse, slow motion, single picture step and/or still picture.
- 25 4. Method or recorder according to any of claims 1 to 3, wherein said bitstream contains access unit start and access unit end marks which indicate the start or the end of an access unit, respectively.
- 30 5. Method or recorder according to any of claims 1 to 4, wherein said access unit information includes an access

unit start map (AUSM) and optional one or more of access unit end map (AUDEM), access unit start location list (AUSLL) and access unit end location list (AUELL).

- 5 6. Method or recorder according to claim 5 wherein, if the access unit end map (AUDEM) exists, for each access unit start map (AUSM) entry an access unit end map (AUDEM) entry is provided.
- 10 7. Method or recorder according to claim 5 or 6, wherein the index of each access unit end map entry is equal to or greater than the entry index of its corresponding access unit start map entry and is less than the index of the immediately following access unit start map entry if any following access unit start map entry exists.
- 15